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REMARKS

This communication is considered fully responsive to the Office action mailed December 29, 2004. Claims 1-29 were examined and stand rejected. Claims 1, 5, 9, 15, 24, 25, 26, and 28 are amended. Claims 10-14, 16-17, 22, 27, and 29 are canceled. Claims 1-9, 15, 18-21, 23-26, and 28 are now pending. Reexamination and reconsideration are requested.

Examiner Interview

The Undersigned thanks the Examiner for the telephonic examiner interview of March 28, 2005. As discussed below, the Office verbally corrected its rejection, replacing the citation of U.S. 6,728,414 to Chang et al. ("Chang") with a citation of U.S. Patent No. 5,454,051 to Smith in the new grounds for rejection. In addition, the Undersigned and the Examiner discussed the context of the described technology, the absence of block transform encoding in Fairhurst, and the improper combination of Fairhurst with a block encoding reference. All independent claims were discussed in context with these issues. The Applicant maintains that the claims are allowable over the cited references but agreed to amend and cancel certain independent claims to obtain ready allowance. Nevertheless, many of the amendments are believed not to alter the scope of the claims.

Response to Arguments

The Applicant acknowledges withdrawal of the Office's previous rejection of claims 1-23 as being unpatentable over U.S. Patent No. 5,097,322 to Fairhurst in view of U.S. Patent No. 6,246,827 to Strolle et al. The Office has stated a rejection based on a new ground in view of "Chang". However, no detailed rejection based on Chang is given in the Office Action. Instead, the detailed rejection refers to Smith, although no citation to Smith is given and there are two Smith references on record. In the week prior to filing of this response, the Office verbally corrected its rejection, deleting reference to Chang and relying on U.S. Patent No. 5,454,051 to Smith. As such, this response addresses the Office's corrected Section 103 rejection of claims 1-9, 15, 18-21, 23-26, and 28 as being unpatentable over Fairhurst in view of Smith.

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Claim Rejections – 35 USC § 103

Claims 1-29 stand rejected under 35 U.S.C. § 103(a) as being purportedly unpatentable over Fairhurst and further in view of Smith. The Applicant respectfully traverses the rejections but amends and cancels certain claims to obtain ready allowance.

Generally, Fairhurst discloses an apparatus for minimizing cross-color and cross-luminance artifacts in the encoding and decoding of quadrature modulated color television signals, not block transform encoded signals. Such artifacts result from imperfect separation of the luminance and chrominance components (not from block transform encoding rounding errors). Under such conditions, certain luminance components can be interpreted by the decoder in the receiver and decoded as color, resulting in cross-color artifacts. Likewise, certain chrominance components can be interpreted by the decoder in the receiver and decoded as luminance, resulting in cross-luminance artifacts. Fairhurst minimizes these artifacts using an improved compensation circuit, which selectively subtracts a compensated luminance signal from the original luminance signal in accordance with detection of an artifact. Fairhurst also identifies other signal formats which can be used in the Fairhurst implementations, including Phase Alternation Line (PAL), analog formats, etc. Col. 7, lines 22-25. Importantly, Fairhurst does not appear to disclose or suggest encoding schemes and signal formats that involve block transform encoding.

In stark contrast, Smith discloses improvements to block transform image compression algorithms by applying a variable lowpass (i.e., blur) operation on block boundaries. Low frequency blocks are heavily blurred, while high frequency blocks should have very little blur. It should be understood that Smith's improvements are integrated into the block transform decoding operations to decode images with minimized block transform encoding artifacts.

The Applicant respectfully submits that the cited references fail to disclose or suggest all of the features recited in each of the pending claims. Nevertheless, many of the pending claims have been amended to obtain ready allowance. In addition, the proposed combination of Fairhurst and Smith for the purpose of rejecting the pending claims is improper. In light of the amendments and the arguments made herein, the Applicant respectfully requests that claims 1-9, 15, 18-21, 23-26, and 28 be allowed.

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Claim 1 recites, among other features, “determining block boundaries”, within the recited context of an image that has been “previously processed by block transform encoding”. The Office states that Fairhurst discloses this feature in FIGs. 7a-7c. However, as previously argued, Fairhurst does not disclose or suggest the block transform encoding addressed in claim 1. Therefore, Fairhurst does not disclose or suggest “determining block boundaries”.

Note that the “determining block boundaries” feature has been amended to recite “in the image”. The amendment is believed not to narrow the scope of the claim in that the image is recited in the preamble to have been block transform encoded and the determining operation merely determines boundaries of the resulting blocks in the image.

Claim 1, as amended, also recites “determining an approximate metric of block transform encoding artifact visibility”. The Office proposes that the recited metric of artifact visibility is disclosed in Fairhurst, col. 4, lines 40-43. The Applicant respectfully submits that the cited language in Fairhurst includes no disclosure or suggestion of a metric of any artifact visibility. Furthermore, as amended, claim 1 specifies that the metric relates to block transform encoding artifacts, which both Fairhurst and Smith fail to disclose or suggest.

Claim 1, as amended, also recites “adaptively filtering luminance . . . dependent on the metric of artifact visibility,” which the Office proposes is disclosed in Fairhurst, col. 3, lines 46-49. However, the cited language, as well as all other language in Fairhurst, fails to disclose any dependence of an adaptive luminance filtering operation on a metric of artifact visibility. As shown, the adaptive filter 100 in Fairhurst shows no dependence on any such metric. Instead, the adaptive filter 100 merely adaptively filters the luminance signal of the image. Furthermore, Smith also fails to disclose this feature.

In addition, claim 1 recites “adaptively adjusting local saturation variation . . . dependent on the metric of artifact visibility”, which the Office proposes is disclosed in Fairhurst, col. 4, lines 50-54. However, the cited language relates to a variable limiter, which is applied to a filtered luminance signal, not to local saturation variation. A “chroma” signal is input as a control parameter to the variable limiter, but this signal is not adaptively adjusted, is not adjusted dependent on the recited metric, and does not represent local saturation variation. Likewise, Smith also fails to disclose or suggest

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adaptive adjustment of local saturation variation. As such, neither Fairhurst nor Smith disclose or suggest this recited feature.

The Office admits that Fairhurst fails to disclose the recited operation of “adaptively simulating high spatial frequency image detail . . . dependent on the metric of artifact visibility”, but submits that this feature is taught by Smith. However, Smith only discloses using a frequency analyzer to determine the amount of high frequency detail in the image and introducing variable blurring to the image, relative to the frequency content of blocks. The Applicant respectfully submits that Smith does not disclose or suggest simulating high spatial frequency image detail. Furthermore, no dependence on the recited metric is shown. As such, neither Fairhurst nor Smith disclose or suggest this recited feature.

Moreover, for the purposes of its Section 103 rejection of all of the pending claims, the Office has improperly combined Fairhurst, which discloses encoding of quadrature modulated color television signals (i.e., analog signals), with Smith, which discloses reducing block artifacts created by block transform compression algorithms in digital images. The Office has submitted that one of ordinary skill in the art would be motivated to combine the references “so as (sic) to provide reducing (sic) block artifacts created by block transform compression algorithms.” Office Action, page 4. The Applicant strenuously asserts that this proposed motivation merely repeats an objective of Smith and completely fails to provide any motivation to combine Smith with the analog television signal encoding of Fairhurst.

The technologies in Fairhurst and Smith are fundamentally different. Smith discloses transforming digital image signals into the frequency domain for encoding purposes and decoding the transformed signals back to digital image signals. In contrast, the quadrature modulated color television signals in Fairhurst are analog signals that are not block transform encoded, are not converted into digital format, and are not transformed into the frequency domain for encoding. Even textually similar operations, such as “filtering” and “encoding”, are fundamentally so very different between the two cited references that they operate on very different principles and on very different types of signals – the technologies simply cannot be combined to obtain any viable solution.

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The Applicant, therefore, submits that one of ordinary skill in the art would not be motivated to combine the teachings of Fairhurst and Smith.

Pursuant to the foregoing arguments, it is clear that both Fairhurst and Smith fail to disclose and suggest all of the recited elements of claim 1. Furthermore, the combination of Fairhurst and Smith is improper in rejecting claim 1. Therefore, Fairhurst and Smith fail to anticipate or make obvious the invention of claim 1. Allowance of claim 1 is earnestly requested.

Claims 2-4 depend from claim 1, which is believed to be allowable. Accordingly, claims 2-4 are believed to be allowable for at least the same reasons as claim 1, and allowance of claims 2-4 is earnestly requested.

The Office rejects claim 5 under a similar analysis as claim 1. However, although claim 5 includes similar features as claim 1, claim 5 also recites different features from those in claim 1, including simulating high spatial frequency image detail by sharpening and adding noise. These additional features are not disclosed or suggested in Fairhurst or Smith. It is noted that Smith adds "blur", which is a filtering, not an addition of noise. Thus, the Applicant submits that claim 5 is allowable for this reason and for at least the same reasons as claim 1. As such, allowance of claim 5 is earnestly requested.

Claims 6-8 depend from claim 5, which is believed to be allowable. Accordingly, claims 6-8 are believed to be allowable for at least the same reasons as claim 5, and allowance of claims 6-8 is earnestly requested.

The Office rejects claim 9 under a similar analysis as claim 1. However, as claim 9 includes some similar features as claim 1, the Applicant submits that these features patentably distinguish claim 9 over the prior art. In particular, neither Fairhurst nor Smith disclose or suggest "adaptively adjusting local saturation variation" in blocks of a block transform encoded image. The Applicant asserts that neither Fairhurst nor Smith disclose or suggest this feature for at least the same reasons as provided with regard to claim 1. Therefore, Fairhurst and Strolle fail to anticipate or make obvious the invention of claim 9. Allowance of claim 9 is earnestly requested.

Claim 10 stands rejected. The rejection is moot, as claim 10 has been canceled.

Claims 11-14 have been rejected based on a similar analysis to that presented for claims 2-4. Claims 11-14 have been canceled.

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Claim 15 has been amended to more clearly recite median filtration of the chrominance channel. Both Fairhurst and Smith fail to disclose or suggest the recited features. Accordingly, Fairhurst and Smith fail to anticipate or make obvious the invention recited in claim 15. Allowance of claim 15 is therefore respectfully requested.

Claims 16-17 stand rejected. The rejection is moot, as claims 16-17 have been canceled.

Claims 18-21 and 23 depend from one of claims 1, 2, 5, 8, and 15, which are all believed allowable, as discussed above and below. Accordingly, claims 18-21 and 23 are believed to be allowable for at least the same reasons as their base claims, and allowance of claims 18-21 and 23 is earnestly requested.

Claim 22 stands rejected. The rejection is moot, as claim 22 has been canceled.

Claim 24 is similar to claim 1, which is believed allowable. Accordingly, claim 24 is believed to be allowable for at least the same reasons as claim 1, and allowance of claim 24 is earnestly requested.

Claim 25 is similar to claim 5, which is believed allowable. Accordingly, claim 25 is believed to be allowable for at least the same reasons as claim 5, and allowance of claim 25 is earnestly requested.

Claim 26 is similar to claim 9, which is believed allowable. Accordingly, claim 26 is believed to be allowable for at least the same reasons as claim 9, and allowance of claim 26 is earnestly requested.

Claim 27 stands rejected. The rejection is moot, as claim 27 has been canceled.

Claim 28 is similar to claim 15, which is believed allowable. Accordingly, claim 28 is believed to be allowable for at least the same reasons as claim 15, and allowance of claim 28 is earnestly requested.

Claim 29 stands rejected. The rejection is moot, as claim 29 has been canceled.

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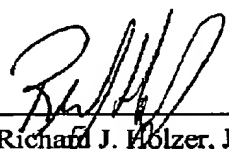
Conclusion

Based on the amendments and remarks herein, the Applicant respectfully requests prompt issuance of a notice of allowance for claims 1-9, 15, 18-21, 23-26, and 28 in this matter.

Respectfully Submitted,

Dated: 3-29-05

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